

SPECIFICATION:

A: TITLE OF INVENTION:

CODE COMPLIANT, TRASH AND/OR LINEN CHUTE INLET DOOR.

INVENTORS:

(All U.S. Citizens)

Edward L. Repic
110 Wallace Circle
Aliquippa, PA 15001
724.857.0758

Michael W. Ennis
738 Clark Drive
Tallmadge, OH 44278

Seymour Oestreicher
7096 DeMedici Circle
Delray Beach, FL 33446

1 B: CROSS REFERENCE TO RELATED APPLICATIONS:

2 Please note that the title of this document has been simplified for ease of reference.

3 This Non-Provisional Patent Application should be cross referenced with the previously
4 submitted Provisional Patent Application: **jc912 U.S. PTO 60/421604 Dated 10 / 27 / 02,**
5 titled:

6 “AN AMERICANS’ WITH DISABILITIES ACT (ADA) COMPLIANT TRASH
7 AND LINEN CHUTE INTAKE DOOR FOR RETROFIT & NEW CONSTRUCTION
8 ADDITIONALLY PROVIDING FOR SMOKE SUPPRESSION AND SUPERVISED
9 ACCESS CONTROL”

10
11 C: STATEMENT OF FEDERALLY SPONSORED RESEARCH AND
12 DEVELOPMENT:

13 Not Applicable

14
15 D: REFERENCE TO SEQUENCE LISTING ...

16 Not Applicable

17
18 E: BACKGROUND OF THE INVENTION

19 **[0001]** A portion of the disclosure of this patent document contains material which
20 is subject to copyright protection. The copyright owner has no objection to the facsimile
21 reproduction by anyone of the patent document or patent disclosure, as it appears in the
22 Patent and Trademark Office patent file or records, but otherwise reserves all copyright rights
23 whatsoever.

1 **[0002]** The present invention relates to an improved inlet system for trash chutes,
2 linen chutes, (and any appropriate synonym for either “trash” or “linen” or “chute”) and the
3 like.

4 **[0003]** Trash and linen chutes are ubiquitous in new and existing residential and
5 commercial buildings. They can also be found in hospitals, nursing homes, hotels and other
6 facilities where relatively large amounts of trash and/or harmful waste are to be conveyed for
7 disposal and/or treatment, whether by removal from the building, incineration, cleaning
8 and/or recycling. Entry to a chute is made via one or more inlets, generally on each building
9 floor. Such inlets are either bottom-hinged or side hinged, and open toward the user.

10 **[0004]** Building codes and other standards, including both U.L.® and the National
11 Fire Protection Association (NFPA), typically require such trash and linen chutes, chute
12 shafts and/or chute enclosures, (collectively, “chutes”) and the inlets that serve them
13 (whether collectively constructed of metal, concrete, fire-rated wall board, masonry, and the
14 like, or some combination thereof) to be designed and constructed to afford the protection of
15 the fire-ratings specific to the characteristics of the installation, i.e., zoning, occupancy
16 use/type, building height and area, etc. The fire rated protection affords Life Safety relief to
17 building visitors, users, occupants and/or firefighters from the untoward consequences of
18 fires and/or their accompanying smoke discharges when such conflagrations are sourced in
19 the chute or at the base of the chute. The intended reliefs come in many forms, either
20 singularly or in combination including but not limited to, fire containment, fire suppression,
21 fire alarms, and exiting or other egress paths. Please see appropriate codes and standards
22 presented on the next page:

Cod	Standards	D scripti n
NFPA	80	This is the National Fire Protection Association Chapter 80 prescribes standards for gasketing materials used for air tightness to control noxious gases or smoke. The Stage I Gasket is in compliance with this standard.
	105	Definitions for Ambient, Warm and Hot Smoke Characteristics. Used as the basis for determining compliance with UL Air Tightness Standard, UL 1784. The Stage II Gasket is in compliance with this standard.
	82	National Fire Protection Association Chapter 82 (NFPA-82) governs the installation requirements for trash and linen chutes. The preferred embodiment meets the existing criteria of this document, including the standards pertinent to the ratios of effective opening and chute diameter for trash and linen chutes, which are addressed by the preferred embodiment in a completely new way.
	Fail-Safe Closed (Proposed New Standard)	This is a proposed new standard to NFPA-82. All previous art experiences and demonstrates a chute intake door failure by presenting the following symptom: the malfunctioning door fails to close. This failure automatically negates the intent of the UL B-Label design of the door because the door no longer closes nor positively latches as required by the UL 10-B, B-Label Standard (a protected opening is designed to prevent the spread of fire across the opening). The preferred embodiment is designed to correct this deficiency by failing to open in the event of a malfunction, thereby maintaining all the life safety features intended by the aforementioned UL standard. This is the essence of the Fail-Safe Closed feature. This feature exceeds the requirements of NFPA-82.
UL	10-C	Allows for application of negative and positive pressure to a 90-Min. B-Label opening during fire conditions. Limits door deflection at the weakest point of the span and seals against smoke transfer across the protected B-Label opening. The Standard has never before been tested on a chute inlet door. All existing art meets the 90-minute B-Label Standard 10-B or other, similar, state-specified standards. Passing UL 10-C automatically includes passing the 10-B standard. Passing the UL 10-B standard does not qualify for 10-C approval.
	250 Deg. Maximum Temp. Rise over 30 Minutes	Maximum allowable temperature rise over the first 30 minutes of the UL B-Label fire test measured at the center of the door face on the side opposite the flame.
	1784	Certification of Air Tightness. Never before applied to a chute intake door. Designed to control transfer of odors and gases across door opening during normal operation. The Stage II Gasket is in compliance with this standard.

Code	Standards	Description
UL	Retrofit Installation (Proposed New Standard)	Proposed new UL Standard for certified retrofit installation of replacement door (All existing replacements void UL certifications by destroying the originally designed assembly because the frame of the door must be removed from the wall (part of the UL 10-B, B-Label Assembly of wall + 90 minute intake door designed to work in concert with one another to prevent the transfer of fire across the protected opening). The preferred embodiment overcomes this deficiency in the existing art by leaving the original frame intact, thereby preserving and adding to the original assembly to maintain the B-Label protection. Additionally added is the UL 10-C Standard related to smoke control thru the use of intumescent materials designed and approved for 10-C applications. The Stage II Gasket is in compliance with this standard.

[0005] Chute inlets typically provide containment through compliance with design features in accordance with Underwriters' Laboratories (U.L.®) Standard 10B. U.L.® 10B stipulates the fire test criteria for approval of 90-minute, B-Label doors to function as part of a door-plus-firewall assembly in new constructions to permit containment. The "assembly" concept is extremely important because a "B-Label" door does not provide containment as a freestanding object. In order to provide containment, the B-Label door must be assembled in a firewall in a manner identical to the assembly that was fire tested by U.L.® in order to secure the U.L.® B-Label rating for the door. In some rare instances, certain chute inlet manufacturers only design to State criteria, often very similar to U.L.®, but in those instances, their door products can only be used in those States issuing the approvals. The purpose of those approvals, however, is very similar in intent: To provide Life Safety protection and relief to building visitors, users, occupants, and/or firefighters.

[0006] The chute industry (and those who govern it with codes, guidelines, standards, inspections, etc.) recognizes that a problem exists when an inlet door of prior art fails. Specifically, component failure in prior art is identified by the inability of the inlet to properly close and latch. Such failure results in the total suspension of the B-Label design

1 approval characteristics of the inlet-firewall assembly, thereby nullifying the potential for
2 containment of fire and/or smoke emanating from the chute. Such failure consequently
3 exposes building visitors, users, occupants, firefighters, and the physical property itself, to
4 the real and well documented potential for catastrophic destruction and/or death.

5 [0007] It is further recognized that the replacement of a failed inlet door generally
6 involves the removal of the existing door and its frame. That removed frame is part of the
7 aforementioned U.L.® approved inlet-firewall assembly, originally constructed to specific
8 Life Safety codes and standards. Removal of the existing inlet frame and the installation of a
9 new inlet door and frame permanently destroys the U.L.® approval criteria because
10 replacement requires destruction of the original anchoring criteria specified in compliance
11 with the originally approved U.L.® testing. In short, the replacement of a door to repair a
12 door that no longer closes (a retrofit installation) is only a choice of the lesser of two evils,
13 not the restoration of original conditions.

14 [0008] Beginning in the previous decade, residential and other buildings have
15 additionally become subject to the progressively revised provisions of the Americans' with
16 Disabilities Act of 1990 (ADA). The mandatory compliance with this Federal law requiring
17 Accessibility for existing buildings, such as apartment facilities and the like, requires the
18 necessity of retrofit construction. The inherent problems of retrofit construction discussed in
19 the previous paragraph are multiplied exponentially by this mandatory compliance.

Code	Standards	Description
ADA	Grab-Pinch-Twist	ADA (The Americans' with Disabilities Act) prohibits grabbing, pinching, or twisting and operating mechanism in order to effectuate the device action.
	Operating Force	ADA limits the maximum operating force required to operate an interior door (without specificity to size) to five (5) pounds.

C d	Standards	Description
ADA	Grab-Pinch-Twist	ADA (The Americans' with Disabilities Act) prohibits grabbing, pinching, or twisting and operating mechanism in order to effectuate the device action.
	Operating Force	ADA limits the maximum operating force required to operate an interior door (without specificity to size) to five (5) pounds.
	Mounting Height	The maximum allowable mounting height of the operating mechanisms of an ADA compliant device is 54" (side reach) or 48" (front reach).
	Wall Projection	The maximum allowable projection of an ADA compliant device is 4" off the surface of the wall.

[0009] Attempts by previous art to address accessibility issues fall short of fulfilling the original construction criteria as discussed in the preceding paragraphs [0007] and [0008]. This prior art also fails to insure that a damaged inlet will close in the event of component failure, if for no other reason than an open, bottom-hinged door that has experienced a gas cylinder, counterbalance-type-failure, cannot defy gravity in order to close itself.

[0010] Unauthorized or unsafe use of a chute inlet due to lack of access control can lead to serious injury or even death should a person injure themselves by falling. Small children and college students have been known to be among the unfortunate victims of such falls.

[0011] Prior art either ignores access control or makes it so expensive as to prohibit its use in many instances.

[0012] Prior art also falls short of protecting workers from the effects of potentially injurious repetitive movements prohibited for workers by the U.S. Occupational Safety and Health Act (OSHA).

C de	Standard	Description
OSHA	Repetitiv Action	Repetitive manual activity can be injurious in the work place. The use of the magnetic key fob eliminates the need for using hands to operate the inlet door. Waste materials can be disposed of with a simple pushing action that can be accomplished without the use of hands if necessary.

[0013] U.S. Patent 6,062,368 issued to Cluster P. Kamm on May 16, 2000 discloses a pull-out door having a rather complex arrangement of an electric motor, electric piston and cylinder lenses for moving the door, a switch means and control. Both the door swingable about a vertical axis and the operating mechanism are set within a frame-like box which can be unitarily installed, i.e. fixed within a pre-prepared opening in the wall housing the chute or the opening of the chute itself.

[0014] The disadvantages inherent in the device of U.S. Patent 6,062,368 are many:

- (a) It is fixed in size and cannot be readily retrofitted or adjusted to variances caused differences in construction; It has a complex operating mechanism which cannot be easily repaired or replaced and which is costly to manufacture;
- (b) Although the patent emphasizes sanitary and health benefits there is no provision to seal the frame-like box in the chute opening to prevent feed back of waste and gases;
- (c) The device of the patent employs a swing axis for the door by which the door swings outwardly into the path of the user inhibiting the efficient use of the system by the user. It is difficult to open when the user has both hands full.
- (d) In the event of a door component failure, the door fails in a "door open" position, thereby negating the minimum, outdated Life Safety features offered.
- (e) Access supervision is not provided, and
- (f) The intake does not address OSHA requirements for the workplace.

1 **[0015]** In addition, various attempts have been made to provide non-automatic
2 doors having a horizontal swing axis at the upper edge of the doors so that the door may
3 close simply by falling. Refer to U.S. Patent 1,108,1784; 1,297,360; 3,980,166; 4,339,998;
4 and 4,694,947.

5 **[0016]** The patents, however, exhibit the same disadvantages as the aforementioned
6 patent and above all, are not push-in.

7
8 **F: BRIEF SUMMARY OF THE INVENTION:**

9 **[0017]** It is, therefore, an object of the present invention to provide a chute inlet
10 door that overcomes the disadvantages and differences of the prior art.

11 **[0018]** It is another object of the present invention to provide a chute inlet door
12 simple in construction and less costly than the prior art.

13 **[0019]** It is also an object of the present invention to provide an improved chute
14 inlet door capable of being easily retrofitted to the chute and easily fitted thereto.

15 **[0020]** It is also an object to provide a chute inlet door having improved sanitary,
16 health and Life Safety characteristics and which is fully sealed when closed, even in the
17 event of door component failure.

18 **[0021]** It is also an object of the present invention to provide a chute inlet door
19 having improved latch means.

20 **[0022]** It is an object of the present invention to provide a chute inlet door with
21 inexpensive, supervised access control for all users, building occupants and workers, alike.

22 **[0023]** It is also an object of the present invention to improve Life Safety in
23 buildings with chutes for visitors, users, occupants, and/or firefighters through compliance
24 with the applicable provisions of the various laws, codes, standards, and guidelines afforded

1 by U.L.®, and NFPA for both new and retrofit construction. In this regard the following
2 synopsis of applicable provisions mentioned above is provided:

3 [0024] It is also an object of the present invention to improve Accessibility in
4 buildings with chutes, whether of new or retrofit construction, through compliance with the
5 applicable provisions of ADA. In this regard the following synopsis of applicable provisions
6 mentioned above is provided:

7 [0025] It is yet another object of the present invention to improve work place safety
8 in accordance with applicable OSHA standards.

9 [0026] These objects and advantages as well as others will be seen from the
10 following application.

11
12 G: BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

13 [0027] In the Drawings:

14 Fig. 1 (1/14) is an exploded view of the inlet door sections and their physical
15 interrelationships to the frame of the current invention. The view is from the rear.

16 Fig. 2 (2/14) is a table of the interrelationships of the inlet door sections, and the
17 various components of those sections, in relationship to the code compliance design criteria
18 (ADA, U.L.®, NFPA, and OSHA) to which inlet doors are subject and formed the basis of
19 this invention.

20 Fig. 3 (3/14) is a front elevation of the trash/linen chute inlet door of the present
21 invention.

22 Fig. 4 (4/14) is an elevation of the inlet door frame indicating the various components
23 of the door, access control, assisted lift & dampening, and dual latching systems all housed
24 by the frame.

1 Fig. 5 (5/14) is an exploded view of the frame components that create the unique
2 frame throat projection, component housings and inlet-surrounding construction -mating
3 surfaces for the installation of Stage II gasketing for new and retrofit installations. Also
4 called out are vertical Cross Sections A-9/14 and A-10/14.

5 Fig. 6 (6/14) is a view from the rear of the door stop assembly components that create
6 the Stage I gasket mounting surfaces through cooperation between the stop assembly and the
7 top of the frame.

8 Fig. 7 (7/14) is a view of the interior structural components of the door frame and the
9 assisted lift and dampening components that control the movement of the door.

10 Fig. 8 (8/14) is a view of the two-piece face panel components that create the exterior
11 skin of the door and provide mounting surface for one application of the Stage II gaskets.

12 Fig. 9 (9/14) is the Section A-9/14 called out in Fig. 5. This is the surface mounted,
13 retrofit construction installation of the door indicating the Stage II gasketing between the rear
14 of the frame and the mounting wall and the Stage I gasketing between the door stops and the
15 front face of the inlet door. Also indicated is the rearward movement of the door swing.

16 Fig. 10 (10/14) is the Section A-10/14 called out in Fig. 5. This is the flush mounted,
17 new construction installation of the door indicating the Stage II gasketing between the rear of
18 the frame and the mounting wall and the Stage I gasketing between the door stops and the
19 front face of the inlet door. Also indicated is the rearward movement of the door swing.

20 Fig. 11 (11/14) includes details of a mechanical, dual-positive latching mechanism
21 powered manually by pushing against the large paddle that can alternatively be mounted on
22 the surface of the door. A key lock provides access control. This drawing also details the
23 construction details of the Stage I gasket system. The gasket is shown in its compressed
24 position of repose between the door stop and the front face of the inlet door.

1 Fig. 12 (12/14) is a schematic of the preferred dual, positive latching, electronic
2 security/access control system. A complete version of the latching mechanism can be seen in
3 Fig. 4 that depicts the latching mechanisms (72) attached to the solenoids (73).

4 Fig. 13 (13/14) is a schematic of an alternative, a dual, positive latching, electro-
5 pneumatic security/access control system. A complete version of the latching mechanism
6 can be seen in Fig. 4 that depicts the latching mechanisms (72) attached to the solenoids (73).

7 Fig. 14 is a schematic of an alternative, a dual positive latching, fully pneumatic
8 security/access control system. A complete version of the latching mechanism can be seen in
9 Fig. 4 that depicts the latching mechanisms (72) attached to the solenoids (73).

10 Alternatively, the latch actuators can be mounted horizontally to project/retract directly into
11 and out of the inlet door panel.

12 13 H: DESCRIPTION OF THE PREFERRED EMBODIMENT

14 **[0028]** This latest inlet is designed for compliance with the applicable provisions
15 and requirements of ADA, U.L.®, and NFPA to achieve an inlet that is capable of retrofit
16 installation. This current art is further designed for compliance with a new U.L.® Standard
17 for B-Label Doors, UL 10C, which considers the effect of negative and positive pressures on
18 doors and smoke control in a fire event. The current art is also designed to meet the criteria
19 of UL 1784 for air tightness as an adjunct to the UL 10C criteria that also includes the control
20 of ambient, warm and hot smoke as defined by NFPA-105, and is beyond the scope of the
21 UL 10B approval for B-Label rated fire doors. UL 10C approval automatically achieves
22 approval of UL 10B. UL 10B does not reach the UL 10C Standard, however.

23 **[0029]** With further regard to ADA, the current art meets the criteria for horizontal
24 projection, mounting height of controls, the prohibition against grabbing, pinching or

1 twisting of operational controls, and the criteria for opening and closing force of interior
2 doors.

3 [0030] With regard to OSHA, the inlet complies with criteria designed to avoid
4 repetitive actions in the workplace.

5 [0031] A particular use of the present invention is as the inlet door assembly for a
6 trash chute 2 to feed a commercial/residential trash compactor or other trash room waste
7 collection configuration. The inventive inlet may also be used in a variety of other
8 installations as well, including commercial and institutional uses for linen collection. The
9 embodiment shown in the drawings is illustrative and will amply exemplify the structure and
10 details of the invention.

11 [0032] As seen in FIG. 7 and FIG. 8, the several door panel components 31, 32, 33,
12 34, 41, 42 comprises a fireproof door panel 30/40 preferably having a front face 41 and rear
13 face 42 between which is interposed a fire retardant insulation material 34 and a tray/frame 30
14 for the insulating material 34 that also acts to provide significant stiffness to the door 30/40
15 for purposes of enhanced structural integrity for durability against abuse and for added
16 stiffness related to the desired level of fire rating under test conditions that might be imposed
17 by Underwriters Laboratories (U.L.®) or the like. The inlet is set within a complimentary
18 rectangular frame 10 also made of fire resistive materials like sheetmetal or a casting
19 installed within a tight fitting opening in the wall 1 or within the framed opening 2 of a chute
20 3. The wall 1 or chute 2 may be a new installation or an existing one. As will be seen, the
21 invented inlet assembly may be used to refurbish existing buildings. The frame 10 extends
22 outwardly from the wall 1 or chute 2 to define an aesthetic trim 100 for the door 30/40 and
23 between which suitable Stage I gasketing 111 or Stage II gasketing 112 is placed so as to seal
24 the door 30/40 during both normal operating conditions and during conditions of fire

1 emergency. The frame **10** is bolted or otherwise secured to the wall by suitable fasteners **19**
2 about its perimeter, and a bead of Stage II gasketing **112** or the like is inserted between the
3 wall **1** and the existing chute frame **2**.

4 **[0033]** The door panel **30/40** is hinged with a 1" diameter pipe **31** along its topmost
5 edge to frame sides **15, 16** and set in oil-lite bushings **18**. In preference, the door panel **30/40**
6 may be provided with several operating mechanisms depicted in FIG's. **11, 12, 13, and 14**
7 that will be described separately, each of which has the following net effect: providing
8 opening access operation that requires no grabbing, pinching or twisting as required for
9 compliance with the provisions of the Americans with Disabilities Act of 1990, and/or its
10 subsequent amendments, updates, modifications, etc.; providing dual, positive latching **72** for
11 Life Safety and security issues; providing assisted lift **54** (either full or partial) to the upward
12 travel (opening) of the door panel **30/40** ; providing dampened return **53** to the downward
13 travel (closing) of the door panel **30/40** ; and to automatically bias the door panel **30/40** into
14 its closed position where it bears against the pari-mutuel Stage I gasket **111** and centers on
15 the latch bolts **72** to maintain the Life Safety design criteria features in normal use and
16 especially as the default, fail-safe position in the event of an inlet component failure.

17 **[0034]** The supervised, security/access control operating systems depicted in
18 FIG's. **11, 12, 13, and 14** include one of several options as may be dictated by the
19 requirements of the new or retrofitted construction, and are as follow:

20 (a) A mechanical system of dual latches **72**, identified in FIG. **11**, actuated
21 manually by pressure against a panic bar-type device **61**, and protected from undesirable
22 access by lock and key **62, 63**;

23 (b) An electronic system of dual latches **72**, identified in FIG. **12**, actuated by
24 a secure access control switch **75** and magnetic fob **76** of any of several possible

1 configurations and devices, including but not limited to, magnetic switches 75, 76, card
2 swipes, keypads, biological identifiers, or the like, etc., of any voltage and from any
3 appropriate DC power system/source 77 or AC power source. Also utilized is an electronic
4 timer 74 that activated by magnetic switches 75, 76 to send a signal to the DC power
5 system/source 77 and to the solenoids 73 that retract for a settable timing sequence of up to
6 ten seconds duration that release the dual latches 72 allowing use of the door panel 30/40 for
7 as long as the user prefers. After the timing sequence ends, dual latches 72 are released by
8 the solenoids 73 permitting the now extended dual latches 72 to await the return of the door
9 panel 30/40 to its natural angle of repose against the stop assembly 20. This alternate is
10 considered best mode because of its simplicity of assembly and maintenance.

11 (c) An electro-pneumatic system of dual latches, identified in FIG. 13,
12 actuated by a secure access control switch 75 and magnetic fob 76 of any of several possible
13 configurations and devices, including but not limited to, magnetic switches 75, 76, card
14 swipes, keypads, biological identifiers, or the like, etc., of any voltage and from any
15 appropriate DC power system/source 77 or AC power source, and utilizing a pneumatic
16 cylinder/plunger 81 in conjunction with a flow control 83 and a regulator needle valve 82,
17 all of which are controlled by and electro-pneumatic timer 84 supplied with house
18 compressed air supply 5 and a 24 volt DC power source 4 to provide action in accordance
19 with that described in the previous paragraph with regard to the movement of the door panel
20 30/40;

21 (d) A fully pneumatic system of dual latches, identified in FIG. 14, actuated
22 by keyed-palm button/switch 91, timed by a pneumatic timer/sequencer 92 powered by a
23 house compressed air supply 5. Activation of the door panel 30/40 is by pneumatic
24 cylinder/plunger 81 in conjunction with a flow control 83 and a regulator needle valve 82,

1 and occurs when the pancake latch/valves used in conjunction with regulator needle valve
2 **82** and acting directly as the dual latch mechanism releases the door panel **30/40** for normal
3 operation. This option may also be actuated by pneumatic switching source/device
4 connected location, at any acceptable pressure required to power the system.

5 **[0035]** The novel construction of the frame **10**, trim **100** and the door panel **30/40**
6 is shown in detail in FIG's. **7, 8, 9, and 10**. The inlet frame **10** is an assembly of sheet metal
7 parts, preferably of aluminized steel, since such material can be bent, cut and shaped at
8 relative ease. Sheetmetal is also light, and provides fire resistance. In he alternative, castings
9 can be used. Simply, the frame consists of two side members **15, 16** reinforced by a vertical
10 bracket/trim **17** bearing point at its forward end. The bodies of the side members **15, 16** are
11 stepped down from the forward end to provide two levels to the frame, one to facilitate
12 surface mounting of the embodiment, and the other to provide access to the throat of a chute
13 **2** being retrofitted with this embodiment. The side members **15, 16** are spaced apart to form
14 at the front an opening for the door panel **30/40** and at the rear a stop assembly **20** preventing
15 the excess movement of the door panel **30/40** (**15" x 18"** is the most common trash door size,
16 while other sizes up to **24" x 24"** are fully possible with the current art. The opening at the
17 front of the frame **10** in cooperation with trim **100** is designed to approximate the allowable
18 effective opening of the door panel **30/40**, by code guideline/convention a proportional
19 fraction of the diameter of the chute **2** being serviced by the inlet. The frame is covered at
20 the top by a C-shaped form **11** fitting over the forward longer bezel. The rear-most leg of
21 the C-shaped form is shortened laterally at each end, leaving a small overhang at one end and
22 a larger overhang at its other end. A second, inverted C-shaped form **12** closes the side
23 members **13, 14** at the bottom end **12**. The second channel member **12**, however, is different
24 in that the foremost is shorter than its rear wall. The side members are further braced by a

1 simple bracket fixed 17 to each side of the members 15, 16 and extended across the rear
2 opening. Lastly the several parts are simply assembled by placing the parts together to form
3 the frame assembly 10 shown in FIG. 1 and the extending horizontal projection in to the
4 chute 2 perpendicular to the wall 1 is folded over the adjacent corner and the main edges
5 welded together. The perimeter adjoining edges of the welded frame 15, 16 and the required
6 frame penetrations for control and other system needs are protected by intumescent caulk
7 113, or the like to prevent a permanent seal the escape of fire or smoke against gas/smoke
8 escape in the event of a fire as an additional Life Safety feature of the embodiment.

9 [0036] As seen in FIG.s 8 & 9 the bottom of the inlet frame 10, when assembled,
10 provides a stop assembly 20 limiting the outward or return movement of the door panel 30/40
11 as it swings shut. The door panel 30/40 comes nearly flush with the edges of the frame
12 opening and forms a seal against escape of he pollutants or fire or smoke, since this
13 perimeter is provided with a Stage I gasket 111. An additional, Stage II 112 gasket, mounted
14 to the door panel 30/40 edges is provided to provide a permanent seal against gas/smoke
15 escape in the event of a fire as an additional Life Safety feature of the embodiment.

16 [0037] The trim 100 can be of any of several colors or exposed metal decorative
17 finishes, and can be embossed with any of several messages or logos.

18 [0038] The description of this preferred embodiment will likely give rise to
19 suggested alternatives and modifications among those familiar with the industry and such
20 products. It is therefore, the desire of this submission to include all such suggested
21 alternatives and modifications as if they were herein incorporated in the scope of this
22 preferred embodiment.